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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/774,046	01/31/2001	William R.C. Graham	Q62952	2136

7590 05/03/2004

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Washington, DC 20037-3213

EXAMINER
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TRAN, LEN

ART UNIT	PAPER NUMBER
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1725

DATE MAILED: 05/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/774,046

Applicant(s)

GRAHAM, WILLIAM R.C.

Examiner

Len Tran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 31 January 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-7 is/are rejected.
- 7) ☒ Claim(s) 4 and 8 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-3 and 5-7 are rejected under 35 U.S.C 102 (b) as being anticipated by Thayer (US 3,807,960) and 35 U.S.C. 102(e) as being anticipated by CORE issues “A closer look at heavy water” .

CORE issues disclose a Combined Industrially Reformed Hydrogen and Catalytic Exchange (CIRCE) heavy water having a series of cascaded stages, the first stage comprising a first stage catalytic exchange column for passing liquid water in deuterium exchange relation with hydrogen gas to produce a deuterium enriched first stage liquid water stream, a Bithermal Hydrogen Water (“BHW”) second stage comprising cold and hot second stage catalytic exchange columns for passing liquid water in deuterium exchange relation with hydrogen gas, said cold second stage catalytic exchange column operating at a lower temperature effective to

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cause transfer of deuterium from hydrogen gas to liquid water, said second stage hot catalytic exchange column operating at a higher temperature effective to cause transfer of deuterium from liquid water to hydrogen gas, means for circulating hydrogen gas in a stream through said second stage cold and hot catalytic exchange columns, means for applying a portion of said deuterium enriched first stage liquid water stream from said first stage catalytic exchange column to said second stage cold catalytic stream to produce exchange column in countercurrent relation to said hydrogen gas a deuterium enriched second stage liquid water stream, means for applying a portion of said second stage liquid water stream to said second stage hot catalytic exchange column in countercurrent relation to said hydrogen gas stream to produce a deuterium depleted second stage liquid water stream, means for applying said deuterium depleted second stage liquid water stream to said reformer, means for removing a portion of said deuterium enriched second stage liquid water stream produced by said second stage cold catalytic exchange column from said second stage. An additional third stage comprising third stage cold and hot catalytic exchange columns for passing liquid water in deuterium exchange relation with hydrogen gas, said third stage cold catalytic exchange column operating at a lower temperature effective to cause transfer deuterium from hydrogen gas to liquid water, said third stage hot catalytic exchange column operating at a higher temperature effective to cause transfer of deuterium from liquid water to hydrogen gas, means for circulating said hydrogen gas in a stream through said third stage cold and hot catalytic exchange columns, means for applying said removed portion of said deuterium enriched second stage liquid water stream to said third stage cold catalytic exchange column in countercurrent relation to said hydrogen gas stream to produce a deuterium. A fourth stage comprising a fourth stage catalytic exchange column for passing

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liquid water in deuterium exchange relation with hydrogen gas to produce a deuterium enriched fourth stage liquid water stream (pages 1-3 of the CORE issues).

Thayer discloses a Combined Industrially Reformed Hydrogen and Catalytic Exchange (CIRCE) heavy water having a series of cascaded stages, the first stage comprising a first stage catalytic exchange column for passing liquid water in deuterium exchange relation with hydrogen gas to produce a deuterium enriched first stage liquid water stream, a Bithermal Hydrogen Water ("BHW") second stage comprising cold and hot second stage catalytic exchange columns for passing liquid water in deuterium exchange relation with hydrogen gas, said cold second stage catalytic exchange column operating at a lower temperature effective to cause transfer of deuterium from hydrogen gas to liquid water, said second stage hot catalytic exchange column operating at a higher temperature effective to cause transfer of deuterium from liquid water to hydrogen gas, means for circulating hydrogen gas in a stream through said second stage cold and hot catalytic exchange columns, means for applying a portion of said deuterium enriched first stage liquid water stream from said first stage catalytic exchange column to said second stage cold catalytic stream to produce exchange column in countercurrent relation to said hydrogen gas a deuterium enriched second stage liquid water stream, means for applying a portion of said second stage liquid water stream to said second stage hot catalytic exchange column in countercurrent relation to said hydrogen gas stream to produce a deuterium depleted second stage liquid water stream, means for applying said deuterium depleted second stage liquid water stream to said reformer, means for removing a portion of said deuterium enriched second stage liquid water stream produced by said second stage cold catalytic exchange column from

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said second stage. An additional third stage comprising third stage cold and hot catalytic exchange columns for passing liquid water in deuterium exchange relation with hydrogen gas, said third stage cold catalytic exchange column operating at a lower temperature effective to cause transfer deuterium from hydrogen gas to liquid water, said third stage hot catalytic exchange column operating at a higher temperature effective to cause transfer of deuterium from liquid water to hydrogen gas, means for circulating said hydrogen gas in a stream through said third stage cold and hot catalytic exchange columns, means for applying said removed portion of said deuterium enriched second stage liquid water stream to said third stage cold catalytic exchange column in countercurrent relation to said hydrogen gas stream to produce a deuterium. A fourth stage comprising a fourth stage catalytic exchange column for passing liquid water in deuterium exchange relation with hydrogen gas to produce a deuterium enriched fourth stage liquid water stream (figures 1-3, col. 4, line 20-col. 9, line 54 in THAYER).

***Allowable Subject Matter***

3. Claims 4 and 8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior arts of record fail to teach a pre-enrichment first stage cold catalytic exchange column, wherein said portion of said deuterium enriched first stage liquid water stream from said first stage catalytic exchange column is first applied to said pre-enrichment first stage cold

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catalytic exchange column before being applied to said second stage cold catalytic exchange column.

***Inquiry***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Len Tran whose telephone number is (571) 272-1184. The examiner can normally be reached on M-F, 8:30 - 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on (571) 272-1171. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Len Tran  
Examiner  
Art Unit 1725

LT  
April 22, 2004

Kiley Stoner AU 1725  
Kiley Stoner 4/27/04